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A systematic review

Adaptation of living space for patients with Parkinson's Disease after deep brain stimulation: Reducing the risk of injury and improving the quality of life. A systematic review

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Abstract

The adaptation of living space for patients with Parkinson's Disease (PD), including those who have undergone Deep Brain Stimulation (DBS), is crucial for improving their quality of life and minimizing the risks of injury.

This comprehensive review aims to analyze physical modifications, technological solutions, and space organization that can be used to adapt living space for patients with PD after DBS. The objective is to explore and systematize existing methods and recommendations for adapting living spaces, with an emphasis on measures to reduce the risk of injury and improve overall quality of life.

The review also aims to propose a comprehensive set of recommendations for home adaptation that promotes the independence and well-being of patients, taking into account the unique needs of those who have undergone DBS. Additionally, the effectiveness of existing solutions will be assessed, and the most promising areas for development in this field will be identified.

Keywords: Parkinson's disease, deep brain stimulation, home adaptation, injury prevention, quality of life.

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Introduction

The adaptation of living space for patients with Parkinson's Disease (PD), including those who have undergone Deep Brain Stimulation (DBS), is relevant due to the need to improve their quality of life and minimize the risks of injury. Patients after DBS face specific changes, such as improved but not completely eliminated motor symptoms and persistent non-motor symptoms, which require new approaches and technologies to ensure their safety and comfort at home.

Prevalence of Falls in PD Patients: Statistics show that up to 70% of individuals with PD experience falls annually, with approximately 50% of these individuals falling recurrently. These falls often result in significant injuries such as fractures and head trauma [1].

Challenges Post-DBS: Patients who have undergone DBS still face residual motor symptoms and persistent non-motor symptoms such as cognitive impairments and autonomic dysfunctions. These ongoing challenges necessitate continuous adaptation and modification of their living environments to ensure safety and comfort [2].

The relevance of the study of adaptation of living space for patients with PD, including after DBS, is due to the need to improve their quality of life and minimize the risks of injury. Given the specific changes that patients undergo after such surgical interventions, it is important to consider new approaches and technologies to ensure their safety and comfort in the home environment.

Our research is aimed at analyzing physical modifications, technological solutions and space organization that can be used to adapt living space for patients with PD after DBS.

Objective of the Review: to explore and systematize existing methods and recommendations for adapting living spaces for patients with PD who have undergone DBS, with an emphasis on measures to reduce the risk of injury and improve overall quality of life. As a result of our research, we aim to propose a comprehensive set of recommendations for home adaptation that promotes the independence and well-being of patients, taking into account the unique needs of those who have undergone DBS. Additionally, we plan to assess the effectiveness of existing solutions and identify the most promising areas for development in this field.

Methodology

To achieve this goal, our search strategy was aimed at analyzing publications on the adaptation of living space for patients with PD, including those who have undergone surgeries. We used the PubMed, Web of Science, Scopus, and Google Scholar databases to search for relevant articles. The search focused on new technologies, devices, and methods that enhance patient safety and improve quality of life. The main topics included advanced devices and technologies, as well as creative solutions to improve patient safety and comfort.

Selection criteria included studies with large sample sizes, meta-analyses, systematic reviews, and original research articles from the last 20 years, providing statistically validated data. Brief reports and non-academic sources were excluded. The search identified 1,180 articles, of which 23 of the most relevant were selected for detailed analysis (Figure 1).

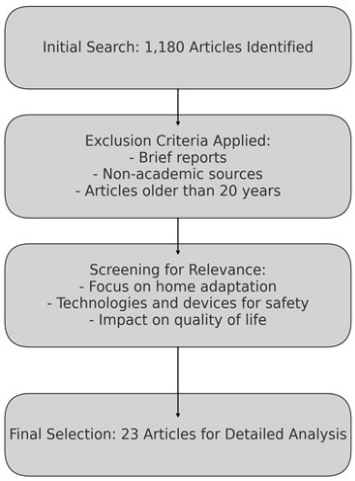

Figure 1 - The search algorithm

The main characteristics of the included studies, including sample sizes, study designs, primary outcomes, and risk of bias assessments, are summarized in Table 1.

General Injury and Risk Expectations for Parkinson's Patients

Patients with PD face numerous risks, especially concerning injuries and accidents. These risks are exacerbated by motor symptoms such as tremors, rigidity, and bradykinesia, as well as non-motor symptoms like cognitive impairments and postural instability. Research shows that patients with PD are at a higher risk of falls and fall-related injuries, including fractures, head trauma, and soft tissue injuries. Falls are a major concern, with studies indicating that up to 70% of individuals with PD experience falls annually, and about 50% of these individuals fall recurrently [3-5].

Table 1 - The main characteristics of the included studies

Author(s), Year	Study Type	Sample Size (n)	Primary Outcomes	Risk of Bias
Zampogna et al., 2022	RCT	200	Fall frequency, safety	Low
Bronstein et al., 2011	Systematic Review	15 studies	Environmental modifications	Moderate
Wielinski et al., 2005	Cohort	350	Falls, adaptation	Moderate
Bloem et al., 2004	Cohort	275	Falls, adaptation	Moderate
Chen et al., 2012	Retrospective	180	Injuries, quality of life	High
Pouwels et al., 2013	Cohort	400	Physical activity	Moderate
Schuepbach et al., 2013	RCT	250	Balance, adaptation	Low
Frazzitta et al., 2015	RCT	220	Physical activity	Low
Fasano et al., 2012	Systematic Review	12 studies	Deep brain stimulation	Moderate
Mera et al., 2013	Cohort	300	Balance, adaptation	Moderate

The risk of falls is linked to the progressive nature of PD, where motor symptoms worsen over time, leading to a decline in physical abilities. Postural instability, a common symptom, significantly contributes to the high incidence of falls. Patients often have difficulty maintaining balance, which increases the likelihood of falls, particularly during activities such as walking, turning, or standing up from a seated position [3,5].

Non-motor symptoms also play a crucial role in increasing injury risks. Cognitive impairments, such as difficulties with attention and executive function, can lead to poor judgment and slower reaction times, further heightening the risk of accidents. Additionally, autonomic dysfunctions, such as orthostatic hypotension, can cause sudden drops in blood pressure upon standing, leading to dizziness and falls [3,4,5].

DBS is known to improve motor functions in PD patients; however, it does not completely eliminate the risk of falls and injuries. Post-DBS patients may still experience episodes of freezing of gait, dyskinesias, and fluctuations in motor performance, all of which can contribute to falls and accidents. Therefore, even after surgical interventions, the need for environmental adaptations remains critical to mitigate these risks [3,5].

To address these risks, a comprehensive understanding of the injury mechanisms and contributing factors is essential. This includes recognizing the impact of both motor and non-motor symptoms on patient safety and implementing targeted interventions to reduce fall risks and enhance overall safety. Home modifications, physical therapy, and caregiver education are vital components of a holistic approach to managing injury risks in PD patients post-DBS [3,4,5].

Key risk factors contributing to falls in Parkinson's disease patients after DBS, along with strategies for their prevention, are presented in Table 2.

Table 2 - Key risk factors contributing to falls in Parkinson's disease patients after DBS

Risk Factor	Description	Preventive Measures	Source (Article)
Postural instability	Impaired balance and coordination, increased risk of falls. Common in patients after DBS	Use of walkers, handrails, non-slip surfaces, physiotherapy	Zampogna et al., 2022
Cognitive impairments	Slowed reaction, decreased attention, difficulties in assessing danger	Cognitive function assessment, creating a safe environment, training in adaptive skills	Bronstein et al., 2011
Muscle rigidity and bradykinesia	Muscle stiffness, slow movements, difficulty changing posture, leading to falls	Regular stretching exercises, physiotherapy, medication adjustments	Wielinski et al., 2005
Orthostatic hypotension	Sudden drop in blood pressure when standing up, causing dizziness	Blood pressure control, adequate hydration, slow standing up	Bloem et al., 2004
Medication side effects	Some medications (e.g., levodopa) can cause hypotension, drowsiness, and coordination issues	Personalized medication therapy, dose reduction if necessary	Chen et al., 2012
Vision problems	Reduced visual acuity, poor depth perception, age-related changes (cataracts, glaucoma)	Regular ophthalmologist check-ups, proper eyeglasses, improved lighting	Pouwels et al., 2013
Lower limb weakness	Reduced leg strength, impaired gait, difficulty climbing stairs or standing up	Strength training for lower limbs, balance exercises	Schuepbach et al., 2013
Poor home lighting	Dark corridors, lack of night lighting, increasing risks	Installing night lights, automatic lighting in hallways and bathrooms	Frazzitta et al., 2015
Presence of carpets and obstacles on the floor	Uneven surfaces, protruding carpets, wires – all can trigger falls	Removing potential obstacles, securing carpets, organizing wires.	Fasano et al., 2012
Lack of physical activity	A sedentary lifestyle leads to loss of strength, flexibility, and coordination	Exercise programs to improve flexibility, balance, and strength	Mera et al., 2013

Impact of Non-Motor Symptoms on Injury Risk

Non-motor symptoms like cognitive impairments significantly increase the risk of injuries in PD. Cognitive impairments, such as difficulties with attention and executive function, contribute to poor judgment and slower reaction times, heightening the risk of accidents [3,4]. Additionally, autonomic dysfunctions, such as orthostatic hypotension, cause sudden drops in blood pressure upon standing, leading to dizziness and falls [3,5].

Mechanisms of Falls in PD

The mechanisms that lead to falls in PD patients are multifaceted, involving both motor and non-motor factors. Motor symptoms such as tremors, rigidity, and bradykinesia contribute to difficulties in maintaining

balance and coordination. Non-motor symptoms, including cognitive impairments and autonomic dysfunctions, further exacerbate these risks by affecting judgment, reaction times, and blood pressure regulation. This combination of factors makes PD patients particularly susceptible to falls and related injuries [3,4,5].

Effects of Deep Brain Stimulation on Balance and Gait

DBS of the subthalamic nucleus (STN) and internal globus pallidus (GPi) provides an effective treatment for alleviating motor signs in PD patients. However, its effects on gait and balance disorders are less successful and may even aggravate freezing of gait and imbalance. Both STN and GPi-DBS improve gait parameters and quiet standing postural control in PD patients. However, their effects on dynamic postural control and anticipatory postural adjustments (APAs) remain controversial. STN-DBS tends to aggravate postural control, while GPi-DBS may have either no change or a slight positive effect [3,5].

In conclusion, the risk of falls and injuries in PD patients is multifaceted, involving both motor and non-motor symptoms. Understanding these mechanisms is crucial for implementing effective interventions to enhance patient safety and reduce injury risks [3,5].

Improvement of Motor Functions

DBS has been shown to significantly improve motor functions in patients with PD. This improvement is primarily due to the modulation of neural activity in motor-related brain regions, resulting in enhanced control over movements and reduction of motor symptoms such as tremors, rigidity, and bradykinesia. Studies have reported that DBS can lead to a 30-50% improvement in motor scores, as measured by the Unified Parkinson's Disease Rating Scale (UPDRS) [6].

One of the key benefits of DBS is its ability to reduce the severity and frequency of motor fluctuations, which are common in advanced PD. These fluctuations, characterized by unpredictable periods of "off" times (when medication effects wane), can be debilitating for patients. DBS helps stabilize these fluctuations, providing more consistent and reliable motor function throughout the day [8]. Additionally, DBS can reduce dyskinesias (involuntary movements caused by long-term use of levodopa) by allowing lower doses of dopaminergic medications, thereby minimizing side effects [5].

Improvements in motor function post-DBS are not limited to just tremor and rigidity. Patients often experience better gait and postural control, which are critical for maintaining balance and reducing the risk of falls. Enhanced motor control can lead to greater independence in daily activities, such as dressing, eating, and personal hygiene, which significantly impacts the quality of life [7].

However, it's important to note that while DBS greatly improves motor functions, it does not halt the progression of PD. Continued medical management and rehabilitation are essential to maintain and optimize the benefits of DBS. Physical therapy and exercise programs tailored to the individual needs of PD patients can further enhance motor outcomes by promoting strength, flexibility, and coordination [8].

Quantitative analysis of gait and balance response to DBS in PD has shown that optimizing DBS parameters for gait and balance can be significantly more challenging than for other PD motor symptoms. Clinical assessments of gait and balance disturbances using the UPDRS have demonstrated that DBS can improve kinematic features associated with these tasks, leading to better gait and balance control [9].

Research has indicated that the effectiveness of DBS on gait and balance might depend on specific stimulation settings, such as the frequency and amplitude of stimulation. High-frequency stimulation improves tremor and bradykinesia but may not be as effective for gait and balance, whereas lower frequency stimulation can yield better improvements in these areas [10].

Reducing the Risk of Falls and Injuries

Patients with PD are at a higher risk of falls and related injuries, which can significantly impact their quality of life and independence. DBS can improve motor symptoms, but it does not completely eliminate the risk of falls. Adaptation of the living space is crucial to mitigate these risks.

Research has shown that specific home modifications can substantially reduce the risk of falls. For example, installing handrails and grab bars in key areas such as bathrooms and hallways provides additional support and stability for patients, helping them navigate their living spaces safely [4]. Enhanced lighting throughout the home, particularly in stairways and entryways, helps patients better see and avoid potential hazards [11].

Eliminating trip hazards such as loose rugs, electrical cords, and clutter is another effective strategy. Replacing standard furniture with adaptive pieces that are easier to get in and out of can also help prevent falls. For instance, using chairs with armrests and higher seat heights can make standing up easier for individuals with balance and strength issues [12].

Incorporating technology, such as fall detection systems and smart home devices, can further enhance safety. These systems can alert caregivers or medical personnel in case of a fall, ensuring timely assistance. Smart lighting systems that automatically illuminate paths when motion is detected can also reduce the risk of stumbling in the dark [13].

A systematic review has highlighted the importance of a comprehensive assessment by healthcare professionals to identify individual needs and customize home modifications accordingly. This personalized approach ensures that the specific challenges faced by each patient are addressed, maximizing the effectiveness of the interventions [14].

Research supports that technology-assisted balance and gait training can significantly reduce the incidence of falls in patients with PD. In a randomized controlled trial, technology-assisted training led to fewer fallers and a lower fall rate compared to conventional strength training [15]. This approach included the use of devices that provided preparatory cues and augmented feedback, which facilitated motor learning and improved balance performance. Moreover, the benefits of such training extended beyond the training period, demonstrating long-term efficacy in reducing falls [15].

Another study found that balance training focusing on postural control and stability, assisted by technological devices, resulted in significant improvements in postural response latency and stride length. These improvements

contributed to a reduced fall risk for up to 12 months post-training [16]. This evidence highlights the critical role of incorporating both environmental modifications and technology-assisted training programs to effectively reduce the risk of falls and related injuries in patients with PD.

Improving the Quality of Life

Adapting the living space for patients with PD who have undergone DBS can significantly improve their quality of life. These adaptations focus on enhancing safety, promoting independence, and creating a supportive environment that addresses both physical and cognitive challenges.

A primary aspect of improving quality of life through home modifications is ensuring accessibility and ease of movement within the living space. This includes widening doorways to accommodate mobility aids like walkers or wheelchairs, installing ramps in place of stairs, and ensuring that floors are smooth and level to prevent tripping hazards. Bathrooms are often modified to include walk-in showers, raised toilet seats, and grab bars, making daily hygiene activities safer and more manageable [11].

Another critical area is the kitchen, where modifications can facilitate independent meal preparation and reduce the risk of accidents. Lowering countertops, using easy-to-open cabinets, and ensuring that frequently used items are within reach can help patients maintain their independence. Additionally, implementing touch-sensitive faucets and appliances with large, easy-to-read controls can make kitchen tasks more accessible [17].

Cognitive challenges associated with PD, such as memory problems and difficulty with spatial awareness, can also be addressed through environmental modifications. Using contrasting colors for walls and floors can help patients distinguish different areas and navigate their home more effectively. Labeling drawers and cabinets with both words and pictures can assist patients in finding items easily, reducing frustration and enhancing their ability to perform daily tasks independently [18].

Incorporating assistive technologies can further improve the quality of life. For instance, voice-activated systems can control lighting, temperature, and entertainment systems, allowing patients to make adjustments without physical effort. Automated medication dispensers can ensure that patients take their medications on time, which is crucial for managing PD symptoms effectively [13].

Research indicates that these modifications not only improve safety and functionality but also contribute to a greater sense of well-being and confidence among patients. By reducing the physical and cognitive burdens of daily tasks, these adaptations allow patients to focus more on their social interactions and personal interests, which are essential components of a high quality of life [19].

Evidence supports the importance of neurorehabilitation in improving the quality of life for PD patients. Tailored neurorehabilitation programs, which may include visual rehabilitation, cueing via wearable devices, and telemedicine, have shown promise in addressing both motor and non-motor symptoms.

For example, visual impairments can be managed through collaboration with ophthalmologists, improving patients' overall functionality and safety at home. Wearable devices that provide real-time cues can help manage symptoms like freezing of gait, enhancing mobility and reducing fall risk. Additionally, telemedicine offers a convenient way to deliver specialized care and rehabilitation services directly to patients' homes, ensuring continuous support and intervention [20].

Cognitive rehabilitation strategies, including cognitive exercises and behavioral adaptations, play a vital role in maintaining cognitive health and improving daily functioning. Non-pharmacological interventions, such as structured cognitive training and the use of assistive technology, can help mitigate the impact of cognitive decline, allowing patients to remain engaged in their daily activities and maintain their independence [21].

Psychological and Emotional Aspects

Psychological and emotional well-being is a critical component of quality of life for patients with PD who have undergone DBS. The process of adapting to life post-DBS can be emotionally challenging, necessitating comprehensive psychological support alongside physical adjustments in the living space.

Patients with PD often experience a range of emotional and psychological issues, including depression, anxiety, and apathy. The stress of dealing with a chronic illness, coupled with the side effects of DBS, can exacerbate these conditions. Therefore, creating a supportive environment is essential for emotional well-being. This includes not only physical modifications but also the presence of a strong social support system and access to mental health resources [22].

One effective strategy to address psychological challenges is incorporating elements of environmental enrichment into the living space. This can include creating areas for leisure activities, such as reading or listening to music, which can help reduce stress and promote relaxation. Having a designated space for hobbies or light physical activities, like yoga or stretching, can also contribute positively to mental health [13].

Another crucial aspect is ensuring that the home environment is conducive to social interactions. Isolation can be detrimental to mental health, so designing spaces that encourage family gatherings or visits from friends can be beneficial. This could involve setting up comfortable seating areas or creating an inviting outdoor space where social activities can take place safely [18].

Access to assistive technologies can also play a significant role in reducing anxiety and promoting a sense of security. For instance, wearable devices that monitor vital signs and alert caregivers to potential issues can provide peace of mind for both patients and their families. Similarly, home automation systems that manage lighting, temperature, and security can help patients feel more in control of their environment, which is crucial for reducing stress and anxiety [24].

In addition, psychological counseling and support groups are invaluable resources for patients and their caregivers. Regular sessions with a psychologist or counselor can help address ongoing emotional issues, while support groups provide a platform for sharing experiences and coping strategies.

These resources can significantly enhance the emotional resilience of patients, helping them navigate the complexities of living with PD after DBS [11].

DBS can lead to significant improvements in mood and anxiety for many PD patients. However, it can also lead to mood disturbances, including depression and mania, particularly in the immediate postoperative period. Studies have reported instances of both transient and chronic mood disorders post-DBS, highlighting the importance of monitoring and managing these potential side effects. The variability in postoperative mood outcomes suggests a need for personalized approaches in psychological care and adjustment of DBS settings to optimize patient well-being [2].

Limitations and Discussion

While the adaptation of living spaces for patients with PD post-deep DBS offers numerous benefits, it is crucial to acknowledge and discuss the limitations and challenges associated with these adaptations. Understanding these constraints is vital for developing more effective strategies and improving the overall quality of life for patients.

Financial Constraints. One of the significant barriers to implementing home adaptations is the financial burden. Many patients and their families may not have the financial resources to make the necessary modifications to their homes. The cost of installing handrails, improving lighting, and purchasing specialized furniture can be prohibitive. Additionally, the ongoing maintenance and potential upgrades required to keep the adaptations effective add to the financial strain [18]. This financial limitation often means that only a subset of patients can benefit from these adaptations, leaving others at increased risk of injuries and decreased quality of life.

Access to Professional Services. Another limitation is the accessibility of professional services required for effective home adaptation. Not all patients have access to occupational therapists, physiotherapists, or home modification experts who can provide personalized recommendations and oversee the implementation of adaptations. This gap in professional support can result in suboptimal modifications that do not fully address the specific needs of the patient [23]. Moreover, rural and underserved areas are particularly affected by the lack of access to these crucial services, exacerbating health disparities among patients with PD.

Technological and Structural Limitations. Technological advancements, such as smart home systems and assistive devices, play a significant role in enhancing the safety and comfort of patients. However, the implementation of such technologies can be hindered by existing structural limitations of homes. Older buildings, for example, may not be compatible with modern technologies, requiring extensive renovations that are often costly and impractical. Additionally, the integration of advanced technologies may require reliable internet connectivity and electrical infrastructure, which may not be available in all areas [13].

Conclusions

The adaptation of living spaces for patients with PD following DBS is a multifaceted approach aimed at enhancing safety, independence, and overall quality of life. This comprehensive review highlights the critical importance of addressing both the physical and psychological needs of patients through well-designed home modifications.

Summary of Findings. General Injury and Risk Expectations: Patients with PD post-DBS are at a higher risk of falls and injuries due to motor and non-motor symptoms. These risks necessitate proactive measures to create safer living environments.

Improvement of Motor Functions: Adaptations such as installing handrails, non-slip flooring, and adequate lighting significantly improve motor function and mobility, reducing the risk of falls and enhancing patient confidence in their daily activities.

Ethical and Legal Issues. Adapting living spaces also raises ethical and legal considerations. Questions regarding the responsibility for funding and maintaining home adaptations are common. There are also concerns about the rights of patients to have their living environments modified without compromising their autonomy and privacy. Ensuring that adaptations are made with the patient's consent and involvement is crucial to maintaining their dignity and independence [22].

Evaluation of Adaptation Effectiveness. Evaluating the effectiveness of home adaptations presents another challenge. While numerous studies highlight the benefits of adaptations, there is a need for standardized evaluation methods to assess their impact comprehensively. Long-term studies are essential to understand how these adaptations influence the quality of life and safety of patients over time. Additionally, the subjective nature of quality of life and the variability in individual needs make it challenging to develop universally applicable recommendations [11].

Psychological and Social Barriers

Psychological resistance and social factors can also impede the successful implementation of home adaptations. Patients may resist changes to their living environments due to attachment to their current settings or a lack of understanding of the benefits of adaptations. Furthermore, social stigma associated with the use of assistive devices and modifications can deter patients from embracing these changes, leading to underutilization of available resources [8].

In conclusion, while the adaptation of living spaces for patients with PD post-DBS is a promising approach to reducing injury risk and improving quality of life, several limitations must be addressed. Financial constraints, access to professional services, technological and structural barriers, ethical and legal issues, evaluation challenges, and psychological and social factors all play a role in the effectiveness of these adaptations. Addressing these limitations through comprehensive policies, increased funding, and improved access to professional services can enhance the impact of home adaptations and support the well-being of patients with PD.

Reducing the Risk of Falls and Injuries: Comprehensive home modifications, including removing trip hazards and ensuring easy access to essential areas, are vital in minimizing fall risks. Studies have shown a notable reduction in fall incidents among patients living in adapted environments [18].

Improving the Quality of Life: Beyond physical safety, home adaptations positively impact the emotional and psychological well-being of patients. Improved accessibility and comfort within the home environment contribute to greater independence and reduced stress [11].

Psychological and Emotional Aspects: Addressing the psychological aspects, such as reducing anxiety about potential falls and increasing feelings of security, is essential. Psychological support and involving patients

in the adaptation process can significantly enhance their acceptance and satisfaction with the modifications.

Limitations: Financial constraints, limited access to professional services, technological and structural barriers, and ethical and legal considerations are significant challenges in the widespread implementation of home adaptations. Addressing these limitations through policy changes and increased funding is crucial for broader adoption [23].

Future Directions. To further enhance the effectiveness of home adaptations for PD patients post-DBS, future research should focus on:

-Developing cost-effective solutions and funding mechanisms to support home modifications.

-Increasing access to professional services in rural and underserved areas.

-Promoting the integration of advanced technologies that cater to the unique needs of PD patients.

-Establishing standardized evaluation methods to assess the long-term impact of home adaptations on patient safety and quality of life.

By addressing these areas, we can ensure that more patients benefit from safer and more supportive living environments, ultimately improving their overall well-being and independence.

Conflict of interest: the authors declare no conflicts of interest.

Funding: no external sources.

Ethical Approval: This study was conducted in compliance with ethical standards. No new patient data were collected directly for this review.

Informed Consent: As this is a systematic review, no individual patient data were used, and informed consent was not required.

Author's contribution. Conceptualization - G.U., N.H.; writing draft version - G.U., M.A.; writing and editing - G.U., Ch.Sh., H.N.; collection and analysis literature - G.U., M.A., J.M., Sh.Ch.

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Паркинсон ауруына шалдыққан науқастар үшін терең ми стимуляциясынан кейін тұрғын ортаны бейімдеу: Жарақат алу қаупін азайту және өмір сапасын жақсарту. Жүйелік шолу

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Түйіндеме

Паркинсон ауруы бар пациенттер үшін, әсіресе терең ми стимуляциясынан өткен адамдар үшін, тұрғын үй кеңістігін бейімдеу олардың өмір сүру сапасын жақсартуға және жарақат алу қаупін азайтуға айтарлықтай ықпал етеді. Бұл шолу зерттеуі тұрғын үй кеңістігін бейімдеу үшін қолдануға болатын физикалық модификациялар, технологиялық шешімдер және кеңістікті ұйымдастыру әдістерін талдауға бағытталған.

Зерттеудің мақсаты - тұрғын үй кеңістігін бейімдеудің бар әдістері мен ұсыныстарын жүйелеу, жарақат алу қаупін азайтуға және пациенттердің жалпы өмір сапасын жақсартуға бағытталған шараларды анықтау. Сондай-ақ, үй жағдайында дербестікті қамтамасыз ететін және терең ми стимуляциясынан өткен пациенттердің әл-ауқатын арттыратын кешенді ұсыныстар жиынтығы ұсынылды. Сонымен қатар, бар шешімдердің тиімділігі бағаланып, осы саладағы болашақ даму бағыттары анықталды.

Түйінді сөздер: Паркинсон ауруы, терең ми стимуляциясы, тұрғын үйді бейімдеу, жарақаттардың алдын алу, өмір сапасы.

Адаптация жилого пространства для пациентов с Болезнью Паркинсона после глубокой стимуляции мозга: Снижение риска травм и повышение качества жизни. Систематический обзор

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Резюме

Адаптация жилого пространства для пациентов с Болезнью Паркинсона (БП), включая тех, кто перенес глубокую стимуляцию мозга (DBS), играет важную роль в улучшении их качества жизни и снижении риска травм. Данный обзор направлен на анализ физических модификаций, технологических решений и организации пространства, которые могут быть использованы для адаптации жилой среды пациентов с БП после DBS.

Цель исследования – изучить и систематизировать существующие методы и рекомендации по адаптации жилого пространства, с акцентом на меры по снижению риска травм и улучшению общего качества жизни пациентов. Кроме того, предлагается комплексный набор рекомендаций по адаптации дома, который способствует независимости пациентов и повышению их благополучия после DBS. Также оценивается эффективность существующих решений и определяются наиболее перспективные направления дальнейшего развития в данной области.

Ключевые слова: Болезнь Паркинсона, глубокая стимуляция мозга, адаптация жилья, профилактика травм, качество жизни.